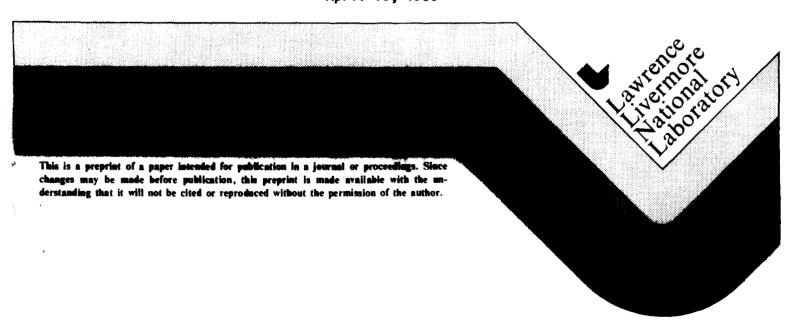# THE Be-Ge (BERYLLIUM-GERMANIUM) SYSTEM

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DISCLAIMER

The Be-Ge (Beryllium-Germanium) System

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Information regarding the Be-Ge system has been cited in [Hansen], [Elliott] and [Shunk]. No new information is available and there is no phase diagram.

[46Ray] predicted the exsistence of an intermetallic compound by considering the electrochemical properties of Be and Ge. [50Kau] reported that a compound phase was present in a 1.4 at.% Ge alloy slowly cooled from melt. However, metallographic and XRD examinations by [60Yan] on a 10 at.% Ge cast alloy only indicated the presence of the terminal phases. [60Yan] concluded that, intermetallic compounds if formed, were only stable at high temperatures.

[59Las] estimated the solubility of Be in Ge from the measurements of electrical properties to be 10^{19} atoms/cm^3 (i.e. 0.023 at.% Be by assuming that the density of Ge to be 5.3267 g/cm^3). [67She] reported that the solubility was at least 10^{19} atoms /cm^3, because they could prepare this alloy composition by the zone-refining techniques. [61Bel] determined the solubility of Be in Ge (alloyed with Sb) by the Hall effect measurements.

Temperature, °C	Composition, $\times 10^{16}$ atoms/cm	$\times 10^{-4}$ at.% Be
920	3	0.68
870	1.6	0.36
830	1.2	0.27
720	0.8	0.18

The equilibrium solubility of Be in Ge as a function of temperature is still unknown.

The melting point of βBe and the βBe --> αBe allotropic transformation temperature are 1289±4 and 1270±6 °C, respectively [85BAP]. The melting point of Ge is 938.3 °C [Melt].

A summary of crystal structure and lattice parameter data is given in Table 1.

Table 1   Be-Ge Crystal Structure and Lattice Parameter Data

Phase	Composition, at.% Ge	Pearson symbol	Struktur-bericht designation	Space group	Proto-type	Lattice parameters, nm		Reference
						a	c	
(βBe)....	0	cI2	A2	Im3m	W	0.25515	...	[King2]
(αBe)....	0	hP2	A3	P6₃/mmc	Mg	0.22857	0.35839	[King1]
(αGe)....	100	cF8	A4	Fd3m	diamond	0.56574	...	[King1]

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Acknowledgments